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ABSTRACT

Attempting to introduce a new viewpoint to communication studies, this speculative and philosophical paper posits technology as an "echo of consciousness." Section one examines technology as a manifestation of attitude, presenting the premise that technologies, consciousness, and systems are not separate components, but products of interacting processes. As a guiding paradigm, the formula V/F = A/T (vibration produces form as attitude produces technology) is offered. Section two presents evidence for and examples of transdisciplinary agreement with the author's views, calling on ancient Greek philosophy and Oriental cosmology, as well as modern technological history and architecture. The third section describes cymatics (the study of vibratory phenomena), and focuses on the work in this area of Hans Jenny, who conducted a wide variety of experiments to discover the relationship between sound vibration and specific substances. Section four discounts the theory that humans are controlled by the electronic media. Section five deals with the idea of the mass media as invented, maintained, and finally obsolesced by the compulsions and attitudes of the human organism. Section six suggests that technology is a broadcasting or expression of consciousness, that consciousness does not fully observe itself, and that consciousness requires a change in its state (rhythm, intensity, wave field) in order for the post Einsteinian world to be understood. (CRH)

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FROM CONSCIOUSNESS TO TECHNOLOGY:

THE IMPLICATIONS OF WAVE PERIODICITY RESEARCH FOR COMMUNICATION STUDIES

by

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> For a man to change his basic, perception determining beliefs--what Bateson calls his epistemological premises--he must first become aware that reality is not necessarily as he believes it to be. This is not an easy or comfortable thing to learn, and most men in history have probably been able to avoid thinking about it... But sometimes the dissonance between reality and false beliefs reaches a point when it becomes impossible to avoid the awareness that the world no longer makes sense. Only then is it possible for the mind to consider radically different ideas and perceptions.[1]

I. TECHNOLOGY AS A PRODUCT OF ATTITUDE

Consider the hypothesis that technology is an echo of consciousness. In this essay, that postulate will be considered in the light of 1) common sense reasoning, 2) examples of cross-disciplinary agreement and 3) evidence from the science of cymatics, the study of wave periodicity and its effects. Strict determinists, materialists, and technocrats may believe that consciousness is the child, not the parent, of technology: the thesis of this paper does not contend with their assumption, but rather holds that theirs is a special case which is correct within a smaller context. Below, a larger context of communication transformation will be examined. In essence, it may be true that just as vibration produces form, so attitude produces technology (V/F=A/T).

A major danger within human perception is the imagination that technology, and other material form, exist in a solid state, rather than within a liquid, gaseous, or undefined state. Why should machines and media, less than other forms, be excluded from the omnipresent, fluid world of wave mechanics, energy fields, electro-magnetic design, and sub-atomic interaction? Like people, machines only appear to be solid within the range of daily human perception: in the redirected words of Erick Jantsch, "Structure is an incidental product of interacting processes, no more solid than the grin of a Cheshire cat."[2]

Birdwhistell's perception of individuals applies no less to technologies: "An individual does not communicate; he engages in or becomes part of communication...In other words, he does not originate communication; he participates in it."[3] Technologies, however they are defined, neither communicate, nor originate "communications." They exist within a larger inseparable ocean of wave vibration and are composed of nothing distinctive from other solar energy-matter.

The dream that technologies, consciousness, or even systems are separate components worthy of isolated inspection is rudely disrupted by a plethora of post-Newtonian discoveries. Heisenberg, Planck, Lovelock, Einstein, Waskom, Glashow, among others, may be summoned to the witness stand; for the moment, however, let us consider the claim of the Swiss scientist Hans Jenny, whose research suggests that all objects, organisms, and phenomena presently known to human beings, are illusionistic in form. Jenny's experiments, which draw upon physics, cymatics, and

natural science, suggest that the seeming physical components and systems of observable reality are merely levels of periodic vibration. In Jenny's words,

> Events do not take place in a continuous sequence, in a straight line, but are in a continual state of vibration, oscillation, undulation, and pulsation. This also holds good of systematized structures. On the largest and smallest scale, we find serial elements, repetitive patterns, and the number of fibre stromata, space lattices, and reticulations is legion. And if we turn our eyes to the great natural domains, periodicity expands to include the ocean itself...In organisms of course, we find pure oscillatory phenomena rising to a higher plane in the formation of sound; and language itself appears on a still higher plane within the same field. If an inventory were to be drawn up of periodic phenomena in the realm of the organic, it would have to include the whole scope of morphology, physiology, biology and histology. But we must not forget the inorganic world. In this field we shall merely mention some typical examples, recalling known facts, with reference to physics. Here we encounter vibrations in a pure form, more specifically in waves. In the vast spectrum extending from gamma radiation, through the ultraviolet and visible light to infrared (heat rays) to electric waves (microwaves and radio waves), we have a field which may be termed periodic in the purest sense of the word.
>
> And then there are waves in the various states of matter, acoustic vibrations, ultrasound and hypersonics. Again the lattice structures of matter in the crystalline state are also periodic. Periodic structure is a salient principle in, say, the space lattices of mineralogy. What insights into vibration and periodicity have been gained in the vast range extending from the cosmic systems (rotations, pulsations, turbulences, circulations, plasma oscillations, periodicity of many kinds in both details and the whole) down to the world of atomic or even nuclear physics (shell model of nucleus; nucleon structure; organization of meson clouds)! Here again the idea of periodicity is all-embracing.[4]

If Jenny's vision is accurate, then the components of "reality" discussed by intellectuals--technology, institutions, classes, resources, etc.--are all analagous to characters in a television program: they

appear to interact but are in fact part of a larger invisible broadcast signal. The fact that each television character appears separate is meaningless in the larger scheme of things where all broadcast television images are seen as the visible outcome of invisible waves. Continuing this analogy, one way of viewing the new paradigm, as in this case presented by Jenny, is to visualize that all form--human, mineral, vegetable--is broadcast throughout the solar system (and probably beyond). Thus it is only meaningful to discuss the effects "television" has on "children" or the "computer" has upon "institutions" or vice versa in a fictional context, that is, in the way one discusses the relationship between "the Road Runner" and "Coyote" or "Kermit" and "Miss Piggy"--as wavelength illusions translated at the surface level of human aural/visual perception.

In fact, however, if "vibration" interpenetrates or even shapes the discernible whole, nothing short of a revolution in perception is required to understand communication: each medium, each institution, each director or auteur, each system or process, only seems to be an agent of change, cause, or effect; all come and go in a channel of vibration like a fleet of noodles on a sea of whirlpools.

More startling than our existence as pulsation patterns is the implication that individual consciousness itself, like a local television station (in the smaller context) is programming or recreating the form of our environment. To discover common sense analogies of this invisible/visible relationship is not difficult: hidden winds blueprint

the trajectories of falling leaves and rising kites; magnets and magnetic fields control the direction of close iron filings and distant compasses. Still the notion that consciousness preforms the environment is more challenging than perceiving that humans and their technologies are delicately held together by the same waves.

II. EVIDENCE AND EXAMPLES OF TRANS-DISCIPLINARY AGREEMENT

Such a notion, like virtually all others, may be traced to the Greeks and beyond, which is not surprising if history is also a network of ripples. Among the Pre-Socratics the idea of humans and their artifacts co-participating within an endless flux was not atypical. Indeed Plato's vision of the "ideas" of things preceding or superceding (depending upon translation) things in themselves is a discernible great-grandparent to the axiom "vibration (cf. consciousness) adumbrates form (cf. technology)." Moreover, Aristotle's description of formal cause fits the picture of an invisible mold (a deceptively static image) shaping the time and space of material/activity. Even the ancient Hebrew and Oriental cosmological references to the "heaven" and the "earth" may be retranslated as the "invisible" and "visible" or "vibration" and "form." At the discrete level of human function, this polarity could become consciousness (cf. attitude) and technology (cf. environment). Hence vibration is to form as attitude is to technology (V/F=A/T).

In modern times both knowledge and mythology have become more specialized as academic disciplines and religious belief systems, which at the level of human vibration, may be indistinguishable. Despite the appearance of fragmentation, occasional spokespersons for a divergence of interests recognize a common cause or bloodstream which preforms departments and denominations no less than other divisions. For Yale technology historian, Siegfried Giedion, vibration is perceived at the level of human consciousness and termed attitude. In Mechanization Takes Command he writes:

> Tools and objects are outgrowths of fundamental attitudes to the world. These attitudes set the course followed by thought and action. Every problem, every picture, every invention, is founded upon a specific attitude, without which it would never have come into being.[5]

Transposing his perception from consciousness to society (i.e. collective consciousness) and from technology to architecture (i.e. collective shelter technology), Giedion notes in Space, Time, and Architecture a similar relatedness between the intangible and tangible. In both instances Giedion refers to a nonmaterial agent which permeates his subject matter no less than his discipline.

> Architecture can give us an insight into this process just because it is so bound up with the life of a period as a whole. Everything in it, from its fondness for certain shapes, to the approaches to certain building problems which it finds most natural, reflects the conditions of the age from which it springs.[6]

Another prominent historian of technology, Lewis Mumford, reveals similar attitudes when he writes:

> Behind all the great material inventions of the last century and a half was not merely a long internal development of technics: there was also a change of mind."[7]

Like Giedion and many others, Mumford thinks of the immediate vibrational envelope containing and preceding technology in socio-cultural terms, as he indicates in Technics and Civilization:

> Not merely must one explain the existence of the new mechanical instruments: one must explain the culture that was ready to use them and profit by them so extensively.[8]

Academics who see their discipline as related to other disciplines, or their subject matter as related to society/culture are not rare: communication, for example, is often perceived as an interdiscipline.[9] But the perception of an overarching discipline, within which all disciplines are carried by a common current (and all thinkers/researchers tune in overlapping segments of the same broadcasts as their subjects and surroundings), is both novel and disorienting.

In consulting "other" disciplines, one is reminded that the invisible essence of visible forms is a current paradigm. Einstein's formulation of the cross-over point between energy and matter, for example, does not by-pass the workings of human brains and technologies. Genuine understanding and application of (post-) Einsteinian research would radically alter the very premise of both disciplinary and interdisciplinary thinking. Moreover, the discoveries of (post-) Copernican astronomy have had

radical implications for human thought. Nevertheless, the current disciplinary methodologies still act upon the assumption that the earth, if not its inhabitants or their tools, is the focal point of the universe.

Given the findings of astronomy, nuclear physics, biology and chemistry, perhaps human beings need not only a larger (macro) perspective and smaller (micro) perspective; they currently require a change of state from a fixed to a fluid perspective--a mode of thought which not only recognizes ubiquitous cycles, frequencies and waves, but no longer jams or blocks these vibrations with rigid attitudes and dogmatic concepts. When Whitehead described the traditional Western view as "the trust that the ultimate nature of things live together in a harmony which excludes mere arbitrariness", possibly he indicated that we sense an underlying stream of reality far less crystallized than our knowledge.[10]

III. CYMATICS

> Confronted with anomoly or with crisis, scientists take a different attitude toward existing paradigms, and the nature of their research changes accordingly, the proliferation of comparing articulations, the willingness to try anything, the expression of explicit discontent, the recourse to philosophy and to debate over fundamentals, all these are symptons of a transition from normal to extraordinary research.[11]
>
> --Thomas Kuhn--

Cymatics [from kyma (wave) and ta kymatica (wave matters)] is the

study of vibratory phenomena and the much larger world of their effects,[12] within the tradition of E.F.P. Chladni who had laid down the experimental principles of acoustics (Die Acoustik, 1802). The word stretches to include such diversified works as G. V. Bekesy's 1928 experiments with the cochlea to Richard Heinberg's Resonance (1977).[13] Undoubtedly due to the apparent familiarity of the sound of the word, it may become occasionally confused with the more abstract theoretical schools of thought such as semantics, cybernetics, or semiotics. Hence great care must be taken to introduce cymatics as a formal subdiscipline of Physics, a laboratory science, and, as previously described, potentially a "general field" science which both unites and changes present knowledge within existing disciplines.

Dr. Hans Jenny (1904-1977) conducted research in zoological morphology near his birthplace, Basel, Switzerland. By the 1950's, he was induced by the problems of modern physiology and biology to study the phenomena surrounding experimental periodicity (Gesetz der Wiederholung, 1962).

Testing the basic observable fact that form is choreographed by vibration (e.g. earthquake/geological structure and intense voice/trembling furniture relationships), Jenny conducted a wide variety of experiments to discover the relationship between sound vibration and specific substances. His vibratory patterns were generated through a variety of devices from crystal oscillators and electronic tonoscopes to ordinary handbells. His experimental materials covered a vast spectrum of solids, liquids, and gases such as mercury, kaolin paste, lycopodium powder,

plastics, streams of gas, and flames. By measuring and changing the frequency and the amplitude of the vibrations, Jenny produced and reproduced a cornucopia of forms and patterns. (See Appendix)

Videotaped and filmed records of Jenny's work show a world as fascinating as those found through microscope and telescope. Not only do specific harmonics hold symmetrical forms and shapes together; in many cases particles rotate, form tiny globes, and even form larger figures which literally dance in obedience to vibration.[14] Such a picture potentially poses as much challenge to evolutionary theory as evolutionary theory posed to religious cosmologies: the implications of cymatics are that humans neither ascended from apes nor descended from a deity's laboratory; instead life forms are constantly recreated in the likeness of vibration.

Clearly, if vibration is generative, it can also be destructive if manipulated or misunderstood. As Lawrence Blair reports

> Professor Gavreau nearly quit his job at the top of a Marseilles office block due to perpetual illness until he discovered that because of its particular proportions and materials, his office was resonating at an inaudible frequency to an air conditioning plant in a neighboring building. The frequency was making him sick but he was able to cure himself simply by recovering his walls with a less resonant material. Gavreau became so fascinated by sound and intrigued by the whole range of low frequencies produced by the police whistle with a pea in it, he built a giant six-foot version of it powered by compressed air. The unfortunate technician who first tested his whistle died instantly, a post mortem revealing his internal organs had been thoroughly scrambled by the sound.[15]

At the opposite end of the spectrum, Dr. Peter Manners, the English osteopath, has been using his knowledge of cymatics to develop a new approach to healing. The following four quotations from Manners's article "The Future of Cymatic Therapy" should build a staircase of logic from the premise to the application of Manners's approach.

1) As physicians, we dare not stand aloof from the recent amazing advances in physical science, and segregate the human entity from other entities of the physical universe, whether the object of our different sensations is a healthy man or merely a mass of diseased tissue. We are in any case only dealing with a congregation of vibrant atoms, which, in their combination, are the basic constituents of everything that exists.

Dr. Albert Abrams

2) Now if you are prepared to admit that sound waves which are transmitted through the air by bells, which have different structures from each other, will have a different character, you will also have to admit that electronic waves transmitted through vibrant molecules having a different structure from each other, will also have different characters. Then we can be quite sure that vibrant electrons forming a cancerous molecule must be differently numbered, differently arranged, from those forming the tubercular, or any other pathological molecule; and equally sure that the waves, or radiations, they respectively send out, will also be different in character. There will be the tubercular wave, the maleria wave, and, if you like, also the sulpher wave, the quinine wave.

Dr. Peter Manners

3) Sonic oscillation, when applied to the human body, will effect a micromassage of tissues and cells which will effect a balance and improve blood circulation, metabolism, and the pulsing of the nervous system and endocrine glands.

All-Union Research Institute, U.S.S.R.

4) It has been found that wounds heal in two-thirds of normal time when bombarded with sound waves.

Records Department, [16] Guyis Hospital, London

While it is far too early to determine the total effectiveness, implications, and applications of Manners's pioneering treatments, his work does not seem in any way foreign to the larger and more commonplace world of music therapy, which dates to ancient records.[17]

IV. PARADIGMS LOST

For a multiplicity of reasons, the popular suspicion that human beings are to some extent controlled by their environment, by electronic media and the machine age no longer holds its novelty. The quasi-determinist preachments of Jacques Ellul,[18] Marshal McLuhan,[19] and Harold Innis,[20] albeit accurate in the smaller context, by their environment, technological or otherwise, depends upon the assumption that species are somehow isolated components surrounded by other components such as mass media, institutions, and technology.

Such a vision, albeit useful as a map to every day existence, no longer seems credible as a key to understanding a world of fluid vibration. "Components" do not factually exist outside the range of sensory interpretations. According to Jenny

> The whole is of a periodic nature and it is this periodicity which generates and sustains everything. Three fields-the periodic as the fundamental field with two poles of figure and dynamics-invariably appear as one. They are inconceivable without each other. It is quite out of the question to take away the one or the other; nothing can be abstracted without the whole ceasing to exist.[21]

V. PARADIGMS REGAINED

For the moment, however, let us discuss the smaller "context" of daily appearances and trust 1) the imaginary "outlines" between objects perceived in human vision and 2) the misleading organizational processes of the human mind. Even in such a "visible" world, is it not equally sensible to affirm that consciousness is transforming technology? On the surface of the matter alone, are not mass media invented, maintained, and obsolesced by the compulsions and attitudes of the human organism?

The reigning behaviorist-cum-determinist paradigm is correct in a context best illustrated by the following analogy: if a drunk falls in his shower, he may be burned by the "hot" or chilled by the "cool" media no longer within his control (cf. McLuhan et al). Hence it is true, given the illusion of isolation, that humans are "controlled" to the extent they are drunk, or sleep-walking, or paralyzed, or to put the matter more literally, already controlled by habitual unthinkingness. Unless there is understanding and a depth to creative action, people are programmed (media), obsolesced (automation), and even destroyed (weapons) by their own inventions.

But is it not logical that, as a counter-balancing perspective, intelligent, alert, and responsible human beings may create and provide control over media environments--not simply by assuming greater responsibility through action, but also by assuming greater responsibility for consciousness? Is not technological form preceded by PRE-FORM--an invisible blueprint, attitude, or vibration to which form conforms? As the vibratory pattern

of consciousness changes, so does the catalog of artifacts. Hence the question, "Is not the individual ethically responsible for his thoughts and feelings, rather than his behavior alone?"

VI. BEYOND PARADIGMS

Most challenging of all is the fact that consciousness may not fully observe itself. Like Jenny's experiments, all patterned manifestations of thinking--language, arts, and ideas--only reveal the tip of an iceberg. For vibration is more than the subject of this essay--it is also the essay's essence and author.

It is not a new paradigm which is required to understand the Post-Einsteinian world, not a new frame of reference, but actually a change in the state of consciousness. The brain itself seems designed to function at a different rhythm and intensity, within a larger wave field, than its current habits of paradigm formulation permit.

Even a new language must make use of the old and so this paper is not exempt from appearing to create its own components such as "vibration", "form", and "consciousness". But such abbreviations point toward a reality which they are not intended to duplicate. Nor can thorough understanding be the pretense of this writing any more than other human knowledge, which one might more accurately term ignorance.

There is no intention to replace the worship of determinism, behaviorism,

or other theory with some other equally insular word, such as "cymatics". Indeed that field is embryonic, miniscule and no less prone to human bias than other scientific experiments.[22] Instead this paper, as was stated at the outset, seeks to introduce examples of evidence and thinking which suggest the possibility that technology is a manifestation of attitude, just as form is a product of vibration (V/F=A/T). Vibration, in turn, is all-pervasive in the world perceived as external, and is the very essence of the internal world called consciousness.

In this light, technology may be seen not simply as an echo of consciousness, but indeed as a broadcasting or outering (cf. uttering) of consciousness. Even so, from the largest context currently available to extended human perception, it makes no more sense to distinguish consciousness and technology than to pluck a ripple from its pond.

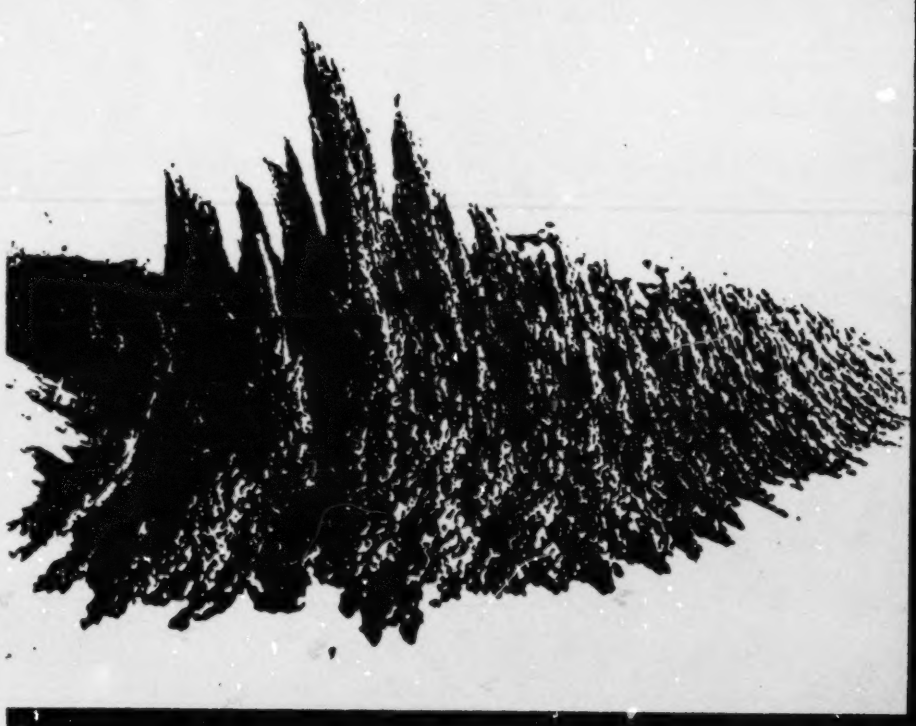
NOTES

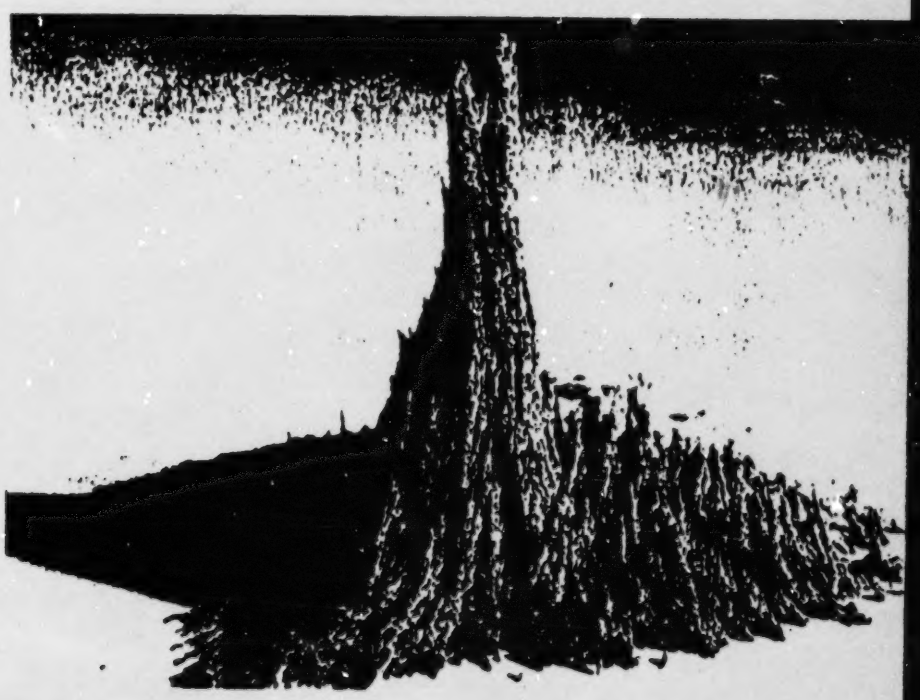
1) Engel, Mark, in Preface to Steps To An Ecology Of Mind, by Gregory Bateson, p. vii.
2) Jantsch, Erick, Design For Evolution, p. xvii, as quoted in Fisher, Aubrey, "The Pragmatic Perspective Of Human Communication", p. 210, in Dance, Frank E.X., Human Communication Theory.
3) Birdwhistell, as quoted in Watzlawick, Beavin, and Jackson, Pragmatics of Human Communication, p. 70.
4) Jenny, Hans, Cymatics, pp. 10, 11-2.
5) Giedion, S., Mechanization Takes Command, p. 3.
6) Giedion, S., Space, Time and Architecture, p. 19.
7) Mumford, L., Technics and Civilization, p. 3.
8) Mumford, L., Ibid, p. 4.
9) Stephen Littlejohn's essay "An Overview of Contributions to Human Communication From Other Disciplines" (Dance, pp. 243-285) offers a cogent discussion: "At its best the study of human communication constitutes an interdiscipline in which communication processes are investigated using insights from several traditional disciplines." (p. 244) Well-known examples of independent interdisciplinary thinking include the works of, for example, Carey, Theall, Gerbner, Thayer, and McLuhan.
10) Whitehead, Alfred N., Science and The Modern World, p. 19.
11) Kuhn, Thomas, The Structure of Scientific Revolutions, pp. 90-1.
12) Jenny, p. 14.
13) Heinberg, Richard, Resonance, Toronto, Read/Lee and Associates, 1977.
14) Although excellent photographs are available in Jenny's Cymatics, patterns involving motion are more vividly demonstrated in film and videotape. In lecture format this lecture includes the 30 min. videotape (excerpts) of Peter Manners's voice-over of Jenny's filmed experiments. The film, introduced briefly by Manners in lecture format, includes over twenty-five minutes of close-up photography and cinematography of cymatic formations, motions, and designs.
15) Blair, Lawrence, Rhythms of Vision, p. 117.
16) Manners, Peter Guy, "The Future of Cymatic Therapy: Sound and Vibratory Pattern Research, Technology Tomorrow, Vol. 3, No. 3, June, 1980.
17) For example, the account of David playing for King Saul in Hebrew literature, the Pied Piper of Hamlin folk tale, and the multiple cultural histories in which mothers and mother surrogates (nurses, sisters, servants) sing lullabies to fearful, restless, sick, or troubled infants all predate but foreshadow cymatic therapy.
18) See, for example, The Technological Society by Jacques Ellul, p. xviii, "As I see it, individual decisions are always made within the framework of this sociological reality, itself pre-existent and more or less determinative."
19) See, for example, Understanding Media, "Specialist technologies detribalize. The non-specialist electric technology retribalizes.", p. 38.
20) See, for example, The Bias of Communication, "We can perhaps assume that the use of a medium of communication over a long period will to some extent determine the character of knowledge to be communicated...", p. 34.
21) Hans Jenny, Cymatics, p. 176.
22) Which, on the other hand is not to convey that the field is an isolated "fad": in addition to Jenny in Switzerland, Bruner in Germany and Manners in England, the eminent Dr. Harold Saxon Burr of the School of Medicine at Yale University, Professor of neuroanatomy and anatomy for thirty years, conducted major field theory research.

APPENDIX

106, 107 Auf einer schwingenden Fläche ist durch die Bewegung der Fläche und der unmittelbar darüberliegenden Luftschicht die Haftung an der Unterlage herabgesetzt. Eisenmehl auf einer schwingenden Membran, zugleich in einem Magnetfeld, bewegt sich fortwährend. Durch die herabgesetzte Adhasion orientieren sich die Eisenpartikel im Magnetfeld mit gewissen Freiheitsgraden der Bewegung. Die Gestalten in 106 und 107 bewegen sich, neigen sich und wandern mit entsprechenden Veränderungen des Magnetfeldes.

106, 107 When a plate vibrates, adhesion to its surface is reduced by the movement of the plate and of the layer of air immediately above it. Iron filings placed on a vibrating diaphragm and at the same time in a magnetic field are in a constant state of motion. As a result of the reduced adhesion the filings dispose themselves in the magnetic field with certain degrees of freedom. The configurations in figures 106 and 107 move, incline, and migrate as the magnetic field is changed.





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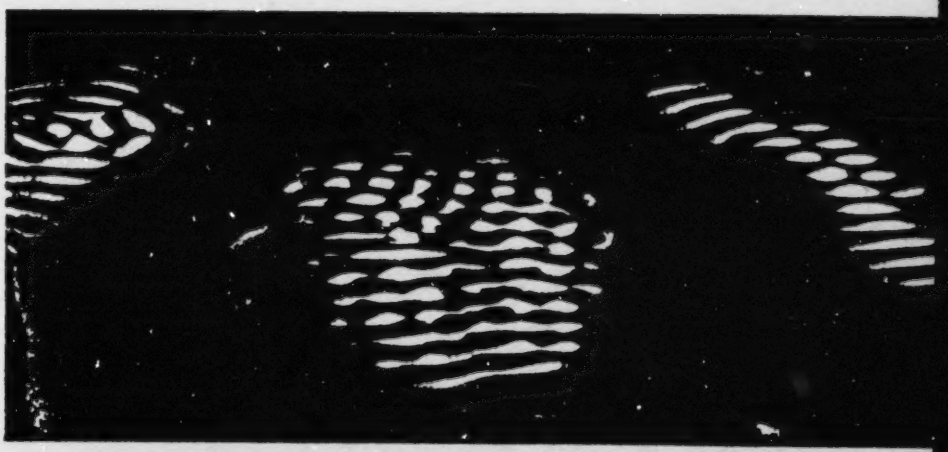
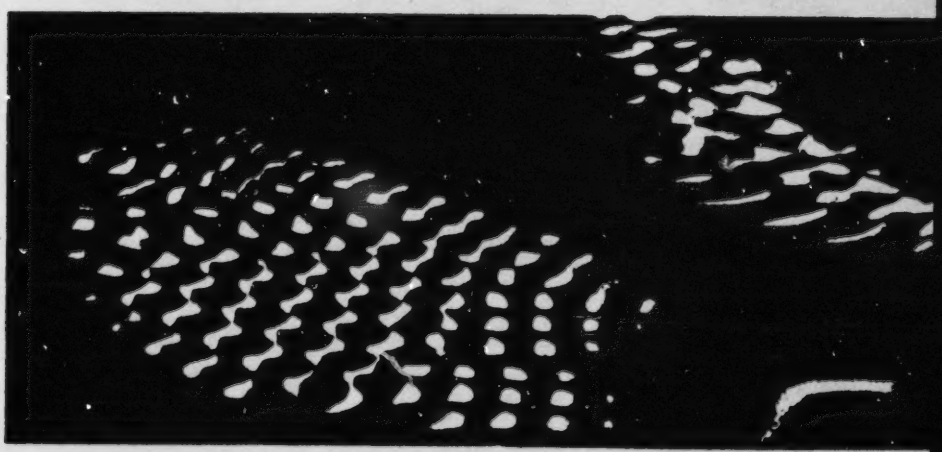
134, 135 Der Übergang vom flüssigen in den festen Aggregatzustand unter Schwingung wird in diesen und den folgenden Abbildungen dokumentiert (Solideszenz unter Schwingung). Der Vorgang kann durch Erkalten, Verdunsten, chemische Umlagerung usw. dargestellt werden. Man geht also immer vom flüssigen Zustand aus. Die Substanz bildet durch die Oszillation Wellen. 134 und 135 geben Einblick in solche Wellengefilde. Was man hier also noch flüssig sieht, wird im Verlaufe des Experiments solid werden und erstarren.

134, 135 The transition from the liquid to the solid state brought about by vibration can be seen in this and the following figures. (Solidescence under the action of vibration.) The process can be exemplified by cooling, evaporation, chemical rearrangement, etc. The liquid state is invariably taken as the starting point. Oscillation causes the substance to form waves. Figures 134 und 135 show wave fields of this kind. What can still be seen here as static liquid becomes solid and rigidifies during the experiment.





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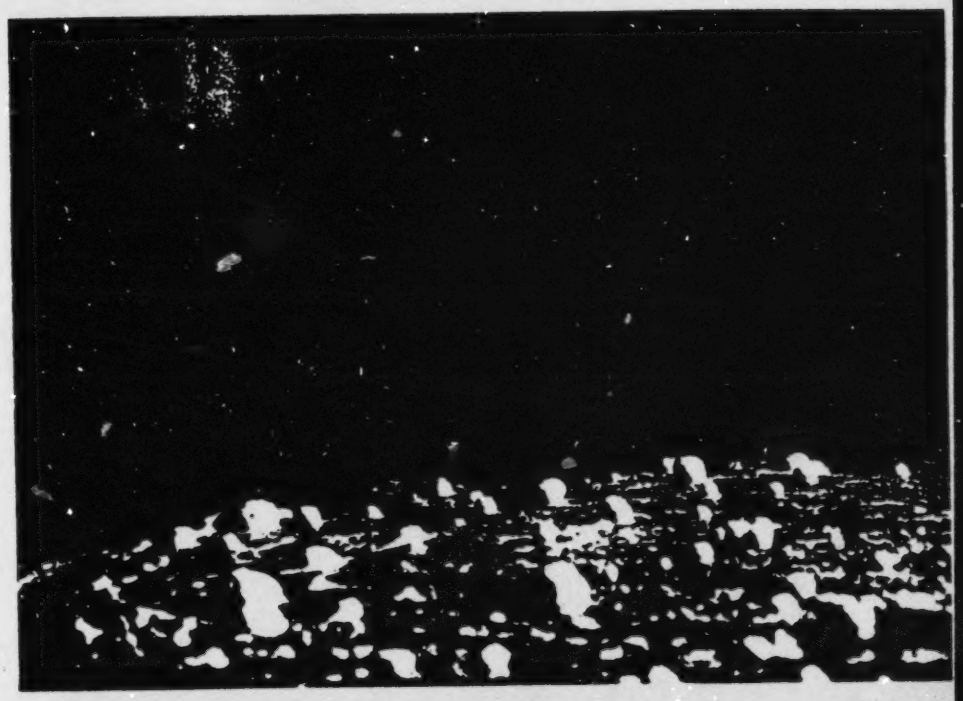
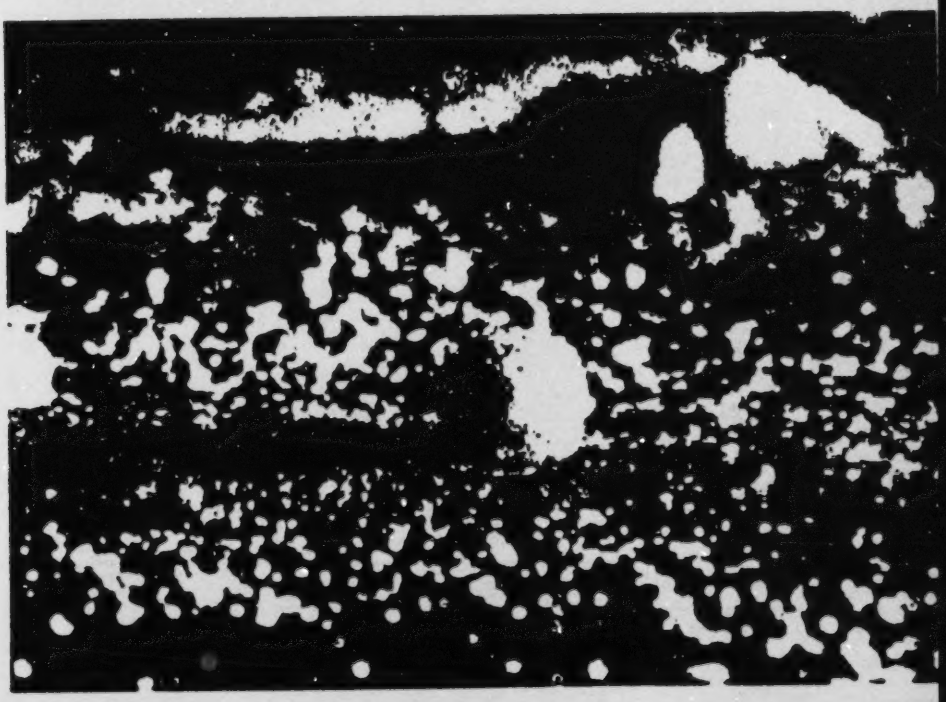
108, 109 Eine plastizierbare Masse wird durch die Oszillation zu Kugeln geformt. Das Material, das zuerst gleichformig ausgebreitet ist, wird unter der Toneinwirkung zusammengeballt. 108 zeigt in Übersicht diesen Vorgang, 109 ein Detail. Wenn das Material im Plastifizieren aufgebraucht ist, rollen die Kugeln (von etwa Taubeneigröße) auf der Membran herum.

108, 109 A plasticizable mass is formed into balls by oscillation. The material is first spread uniformly on the plate and then forms into balls when exposed to the effects of sound. Figure 108 shows a general view of this process and figure 109 a detail. When the plasticity of the material is exhausted, the balls (about the size of a pigeon's egg) roll about on the diaphragm.





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131 Geringfügige Änderungen der Viskosität ändern auch die Erscheinungsformen. Die Flüssigkeit ist leichtflüssiger gemacht. Bei stärkerer Amplitude spritzen die Massen auf und werden ausgeworfen. Man kann den Versuch bis zum Versprayen treiben. Andrerseits steigern sich auch die Wellen; sie sind wie Manschetten oder Töpfe geformt, doch auch sie in fließender Bewegung.

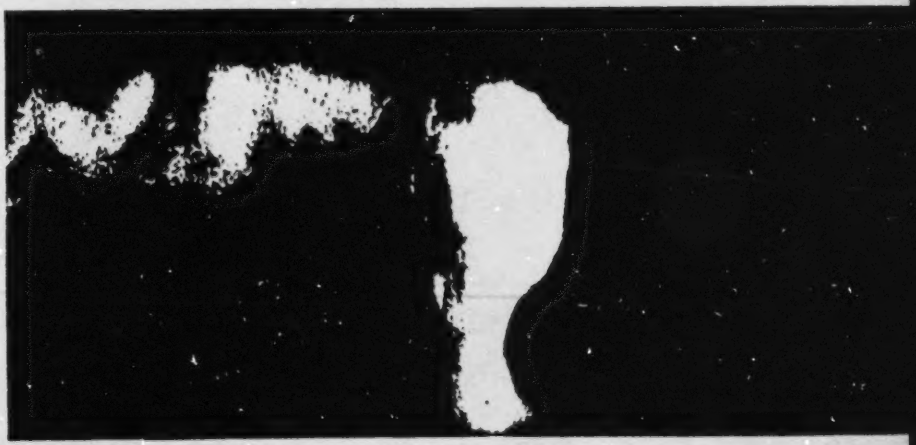
131 Minor changes in viscosity bring about changes in the forms seen. The liquid has been rendered more fluid. When greater amplitudes are used, the masses are flung high and ejected. The experiment can be continued in this direction until the liquid forms a spray. The waves also increase in height and look like cuffs or pots although they are also in a state of flow.

132 In der mannigfaltigsten Weise gestalten sich diese flüssigen, fließenden Plastiken. An einzelnen Stellen erheben sich Wellenwände. Wo die Wellenzüge sich durchgittern, treibt es die Wellen zu Wellensäulen empor. Auch die einige Zeit beharrenden Phänomene sind «lebendig». In sich strömt und pulsiert die Masse. Sistiert man den Ton, so zerfließt der Brei ins Gleichförmige.

132 These fluid, flowing sculptures assume any number of different forms. Wall-like waves rise in some places. Where trains of waves interpenetrate in lattices, the waves rise in columns. Even these phenomena which persist for some time are "living". The mass flows and pulsates within itself. If the tone is stopped, the liquid returns to its uniform state.

133 Bei viskoserer Beschaffenheit des Breies erheben sich Figuren der verschiedensten Art. Die hier abgebildete keulenförmige Gestalt ist tatsächlich durch die Schwingung aus der Masse aufgetrieben; aber nun nicht etwa als fertige Plastik, sondern als fließende Gestalt. Im Stiel der Keule strömt die Substanz empor und wälzt sich um. Auch pulsieren diese Figurinen in sich selber. Je nach der Topographie der Schwingung können sie auch herumgleiten. Diese Vorgänge sind nicht etwa zufällige Begebenheiten, sondern lassen sich systematisch reproduzieren.

133 If the liquid is of a more viscous character figures of the most varied kind take shape. The club-shaped configuration seen here has actually been raised out of the mass by the vibration. It is not a finished sculpture but a configuration in a state of flux. The substance flows up the stem of the club and circulates. These figurines also pulsate in themselves. They may also move round depending on the topography of the vibration. Such processes are not purely adventitious but can be reproduced systematically.



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151

149 151 Figures 149 to 151 also show kinetic dynamics due to vibration. While on the one hand there is a moving world of forms in which the mass is even ejected in the form of spicules (149, 150) we may find on the other wave sculptures (151) of a more persistent nature. But since shapes and patterns appear simultaneously whatever the kinetics and dynamics, the cymatic spectrum is omnipresent and manifests itself consistently everywhere as the basic triadic phenomenon.

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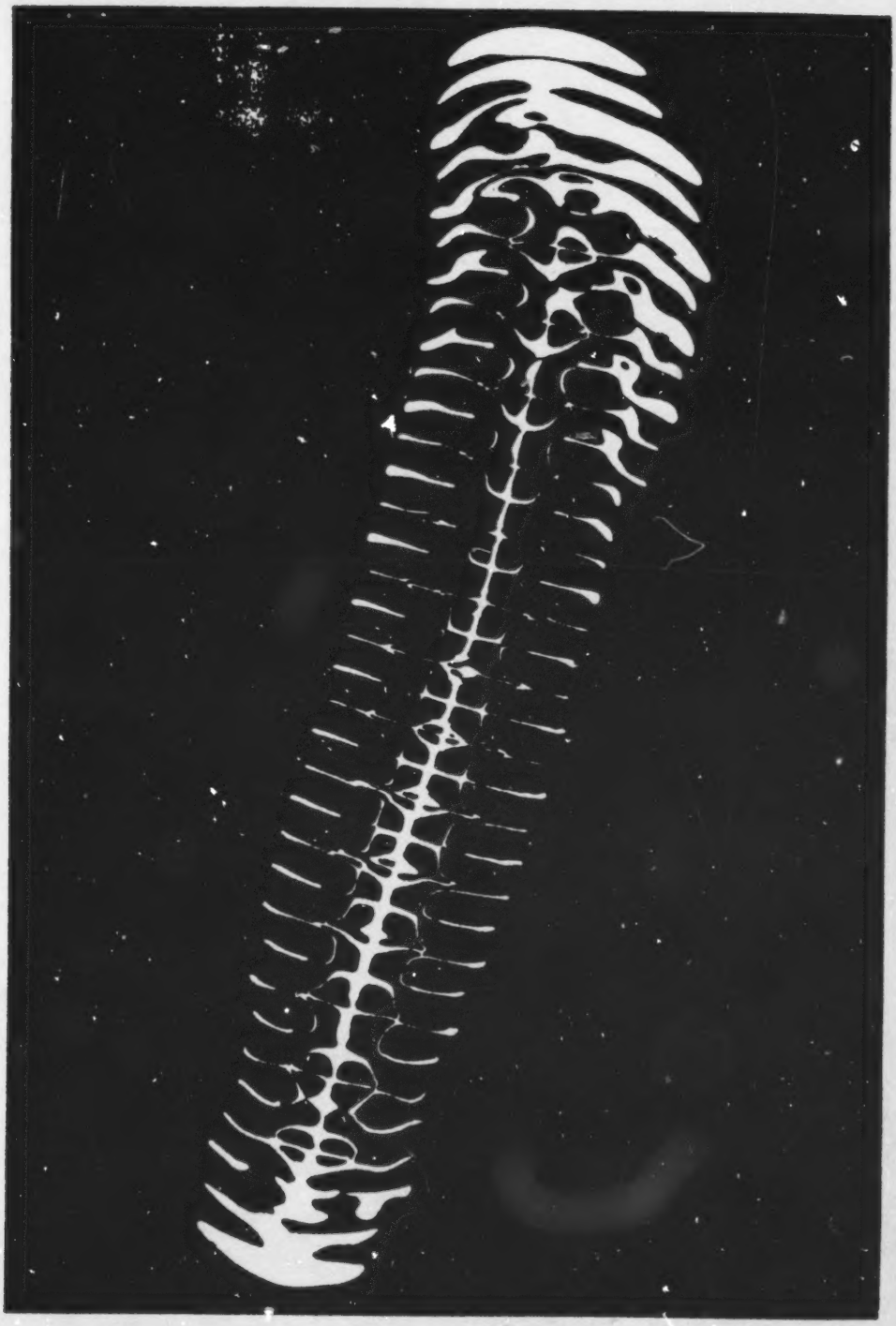

45

45 Wie in 44 ist eine Glyzerinschicht mittels einer Membran durch einen Ton in schwingende Bewegung gebracht. Es resultiert ein fortlaufendes Formenmuster.

45 As in figure 44 a layer of glycerine has been made to vibrate by a tone acting upon a diaphragm. The result is a continuous formal pattern.

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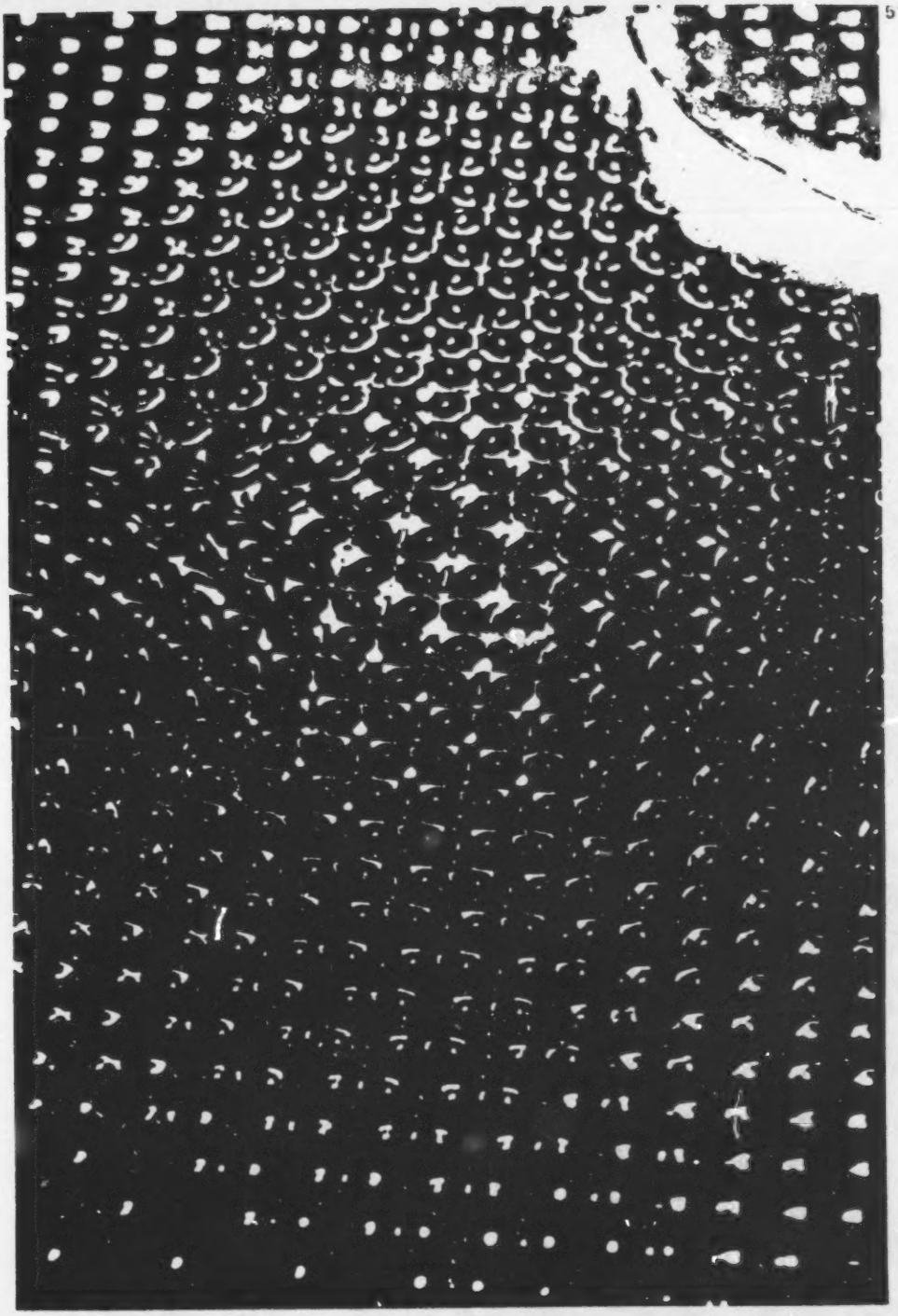

51

51, 52 Bei geringfügigen Änderungen der erregenden Frequenz oder der Amplitude wechseln die Bilder. Sie sind in Bewegung zu denken. Sie spielen auch in Interferenzphasen usw.
52 ist ein Detail der Mittelpartie von 51.

51, 52 The pictures change on the exciting frequency or amplitude being slightly modified. They must be conceived as being in motion and also subject to interference phases.
Figure 52 is a detail of the central part of 51.

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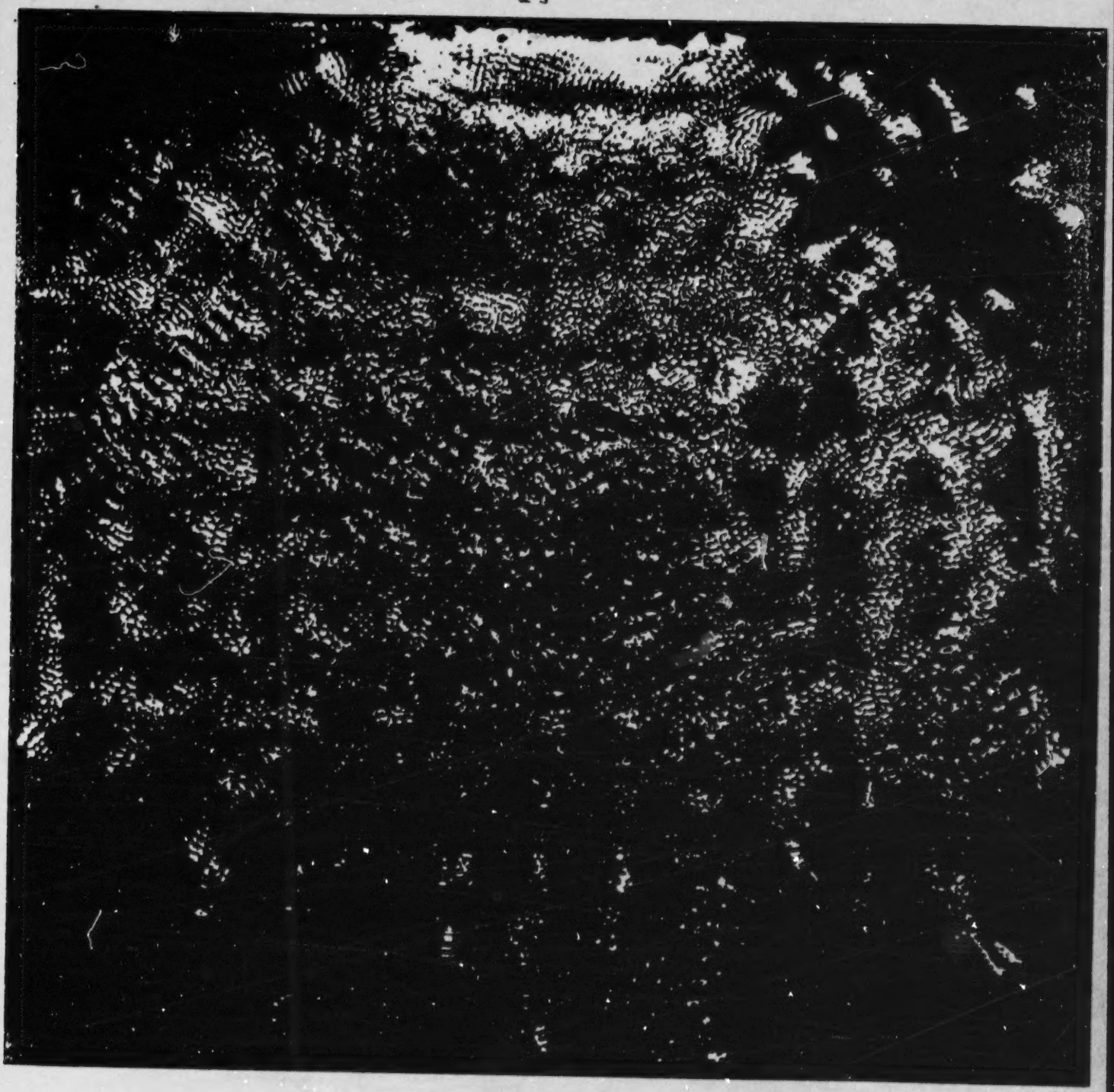

7.' Mozart Jupiter Symphony, 1st movement
bar 1 to bar 45

7.' Mozart Jupiter Symphony, 1st movement
bar 1 to bar 45

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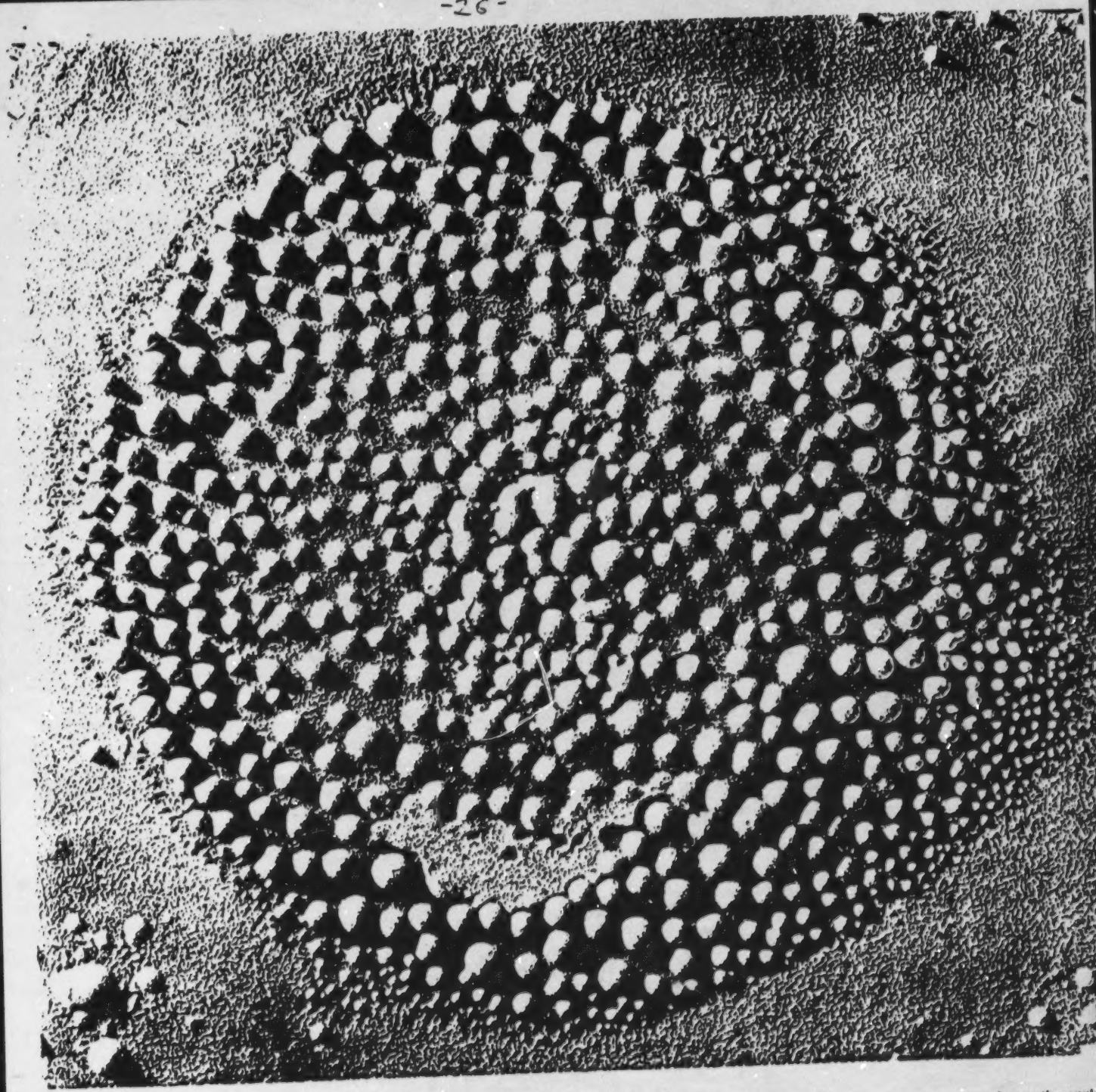

82 Durch akustische Anregung wird die gleichmäßige Lykopodiumpulverschicht durch die Beschallung in zahlreiche Rundformen transformiert. Jede derselben zirkuliert in sich und walzt sich unter gewisser Konstanz der Menge um.

82 Acoustic excitation transforms the uniform layer of lycopodium powder into a number of round shapes. Each of these rotates on its own axis and at the same time circulates in a constant manner round the whole figure.

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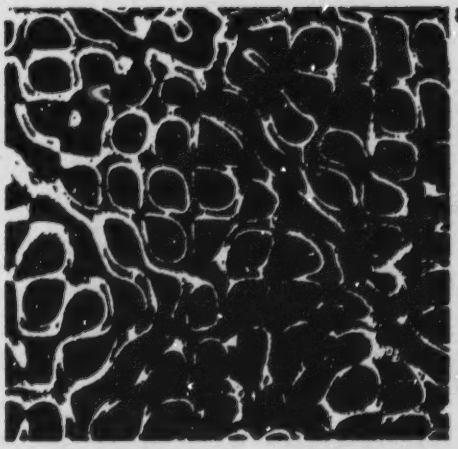
Individuation
Ganzheitliche Verbindung und Sonderung
Dynamik der Eruption
Dynamik der Strömung usw.

Diese Aufstellung zeigt, daß wir Vielwirkung durch Schwingung finden. Die Schwingung ist polyerg und in manchen Effekten spezifisch. Die einzelnen Kategorien sollen nun nicht gepreßt und zerlegt werden, sondern es soll – gemäß der eingeschlagenen empirischen Methode – das Ganze in seinen Erscheinungen belassen werden, wobei das eine Mal die eine Kategorie, das andere Mal die andere überwiegt. Aber eben durch das erzeugende und erhaltende Schwingungsfeld entsteht dieses Ganze. An jeder Stelle ist aber dieses Ganze. Es besteht keine Teilartigkeit, kein Stückwerk, sondern im Gegenteil das Einzelne, indem es der generatorischen Einwirkung ganz teilhaftig wird, hat den Schein eines Individuums, einer individualisierten Quasiexistenz, hat den Schein von Individualität.

phenomena as it is, with now this category, now that category dominatin But it is through this generative and sustaining vibrational field that the ent complex comes into being. And this complex whole is omnipresent. There no parcellation, no patchwork; on the contrary what appears to be a detail i utterly integrated with the generative action and merely acquires the semblar of an individual, of an individualized quasi-existence, the semblance of individuality.

80 Unter anderen Bedingungen formiert sich das Lykopodiumpuder zu Klangfiguren. 80 ist ein Ausschnitt aus einer Klangfigur mit Lykopodiumpulver auf einer Stahlplatte, 31 × 31 cm. Frequenz 12 900. Sehr schön läßt sich bei dieser Aufnahme sehen, wie das Pulver aus den bewegten Zonen gegen und in die Knotenzonen transportiert ist. Man beachte die Präzision der doppelten Konturen als Ausdruck der Knotenpartien.

80 When conditions are different, the lycopodium powder forms sonorous figures. Figure 80 is a detail of a sonorous figure formed of lycopodium powder on a steel plate, 31 × 31 cm. Frequency 12,900 cps. This picture shows very strikingly how the powder is transported from the zones of movement towards and into the nodal zones. The precise way in which the double contours mark out the nodal zones is very conspicuous.



80

81 Klangfigur, welche auf einer Membran durch Lykopodiumpulver sichtbar gemacht i 250 Hertz, starke Amplitude. Es fällt immer w der auf, wie säuberlich die Partikel transport und plaziert werden. Vor der Beschallung wa Pulver gleichmäßig aufgestreut.

81 Sonorous figure appearing in lycopodiu powder on a diaphragm, 250 cps, large amplitude. The neatness with which the part are transported and deposited is a recurrent feature. Before acoustic irradiation the powd was spread out evenly.

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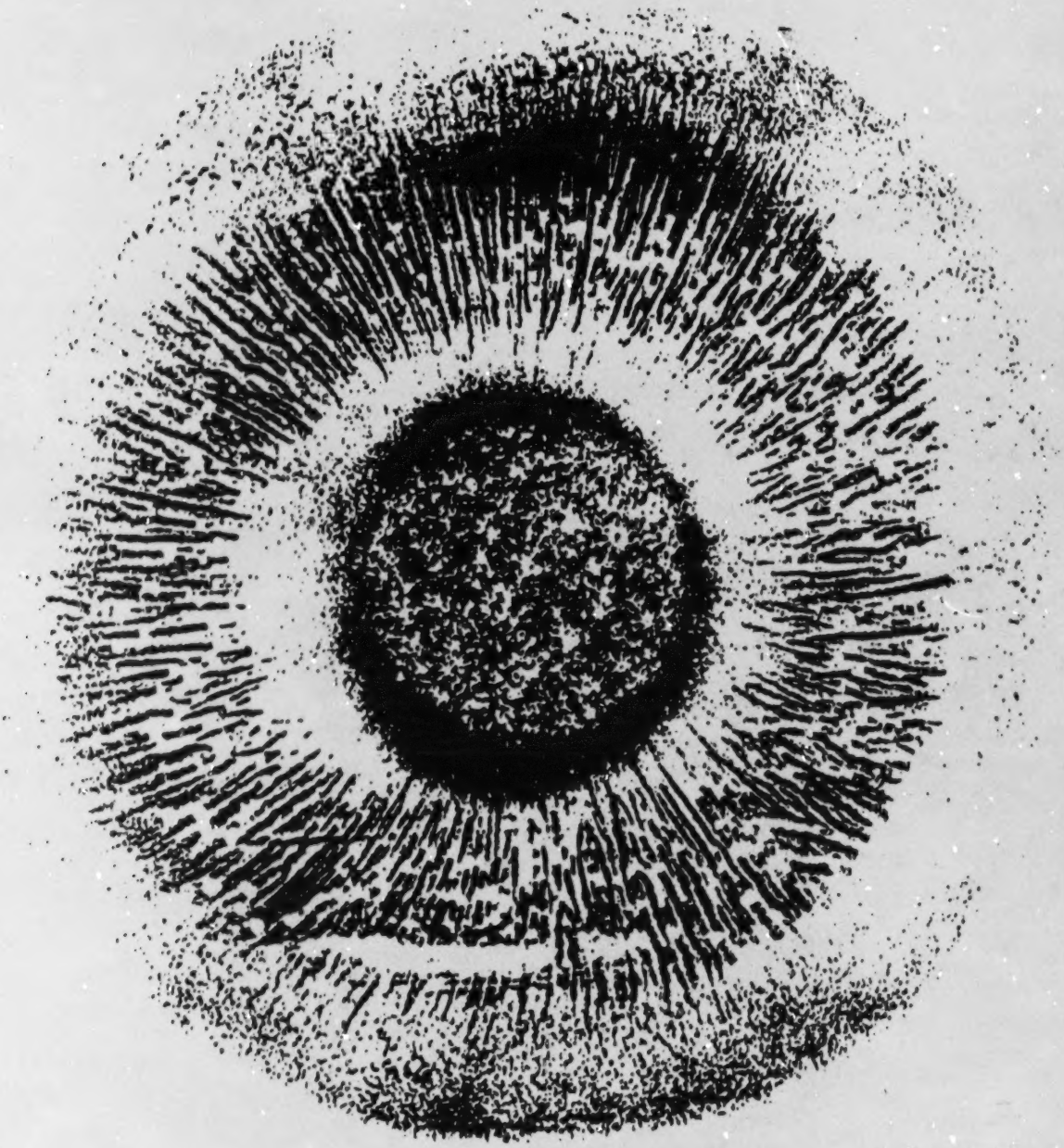

83 Bei crescendo wandern die Rundhaufen im Sinne der Schwingungstopographie zentralwärts. Man sieht die zahlreichen radial gerichteten Wanderwege.

83 On a crescendo the round heaps n to the centre following the topography by the vibration. The numerous radial pa can be seen.

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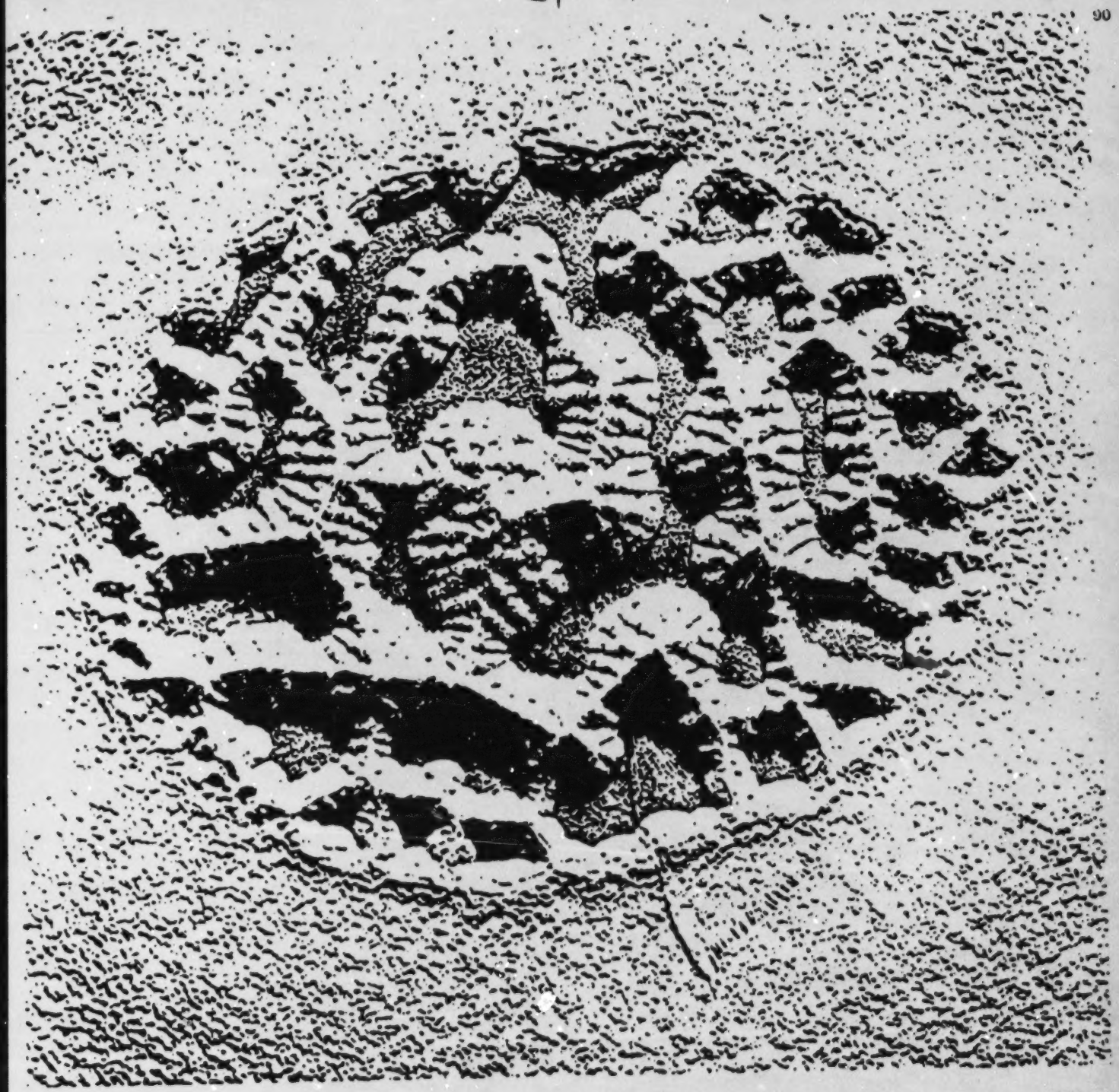

89, 90, 91 Unter Variation der Amplitude ergeben sich die verschiedensten Abläufe. Je nach dem, ob leiser oder lauter Ton, verändern sich die dynamischen Verhältnisse in der bewegten Partikelmasse des Lykopodiums.

89, 90, 91 As the amplitude is varied, the pattern goes through a number of changes. The dynamics of the moving mass of lycopodium particles alters, depending on whether the tone is loud or soft.

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104, 105 Examples of dehiscence. If doughy masses are torn apart, branched, ramified patterns are revealed. The formation is dendritic throughout. The pattern ranges from bush-like growths (104) to the most delicate tracery (105) with every variation in between. In the lower part of figure 104 there is even a cellular pat These phenomena are entirely periodic in character.

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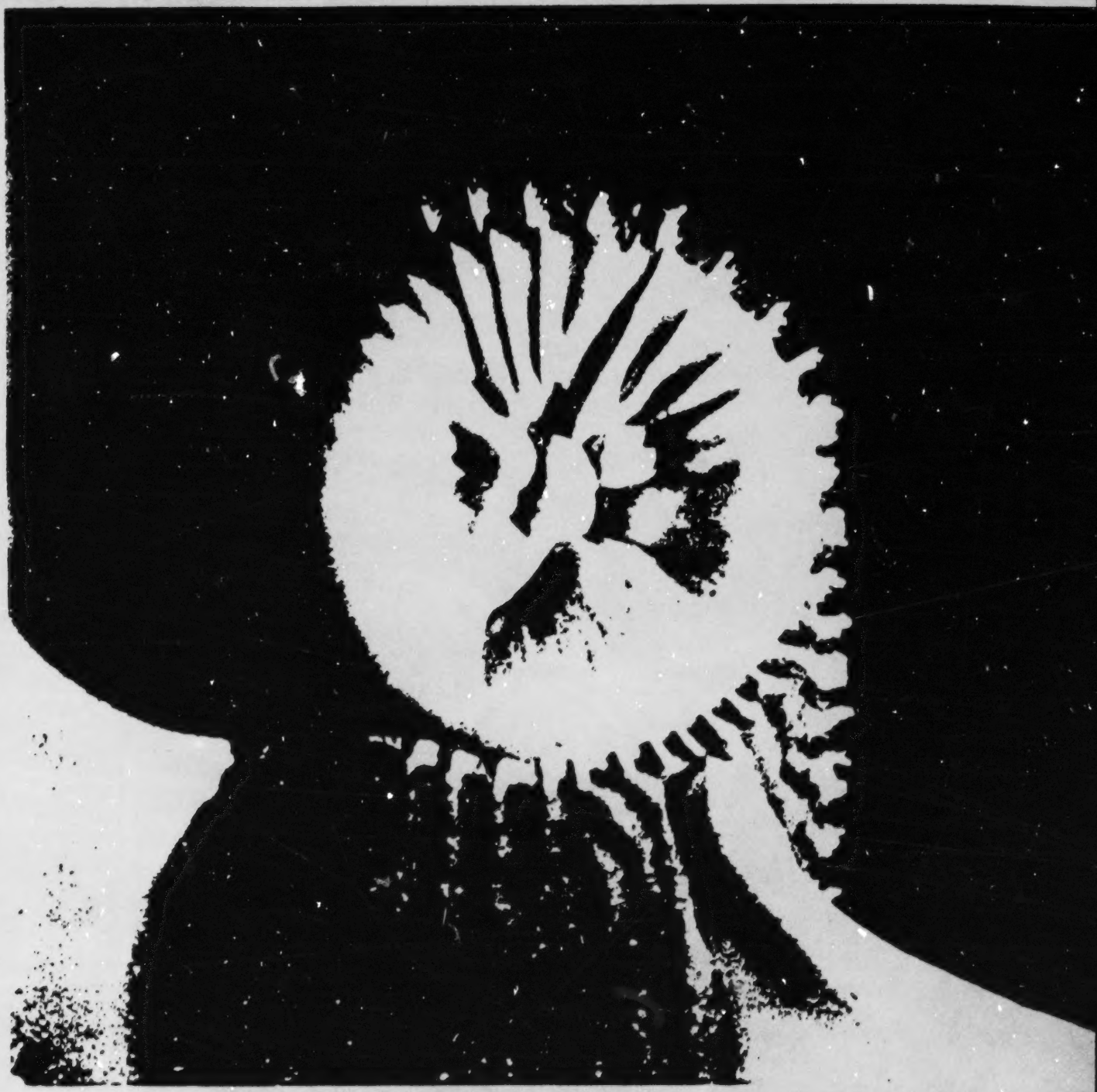

136, 137 Bald ändert sich die Konsistenz. Die Masse wird plastisch-breiartig. Es entstehen Rundgebilde in Umwälzung; außerdem zeigen sie radiale Strukturen. 136 ist von oben, 137 von der Seite aufgenommen.

136, 137 The consistency soon changes. The substance becomes plastic and dough-like. The round configurations which appear are in a state of circulation and also display radial patterns. Figure 136 is taken from above and 137 from the side.

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149–151 Die Aufnahmen 149 bis 151 geben weitere Bilder der kinetischen Dynamik durch Schwingung. Während einerseits eine bewegte Formenwelt e[illegible] bei der die Massen zuletzt als Sp[illegible]ausgeschleudert werden (149, 150), kan[illegible]drerseits eine mehr beharrende Wellenplastik hervorgebracht w[illegible] (151). Da aber immer Formungen und Str[illegible]turen bei aller Kinetik und Dynamik zugleich auftreten, ist überall das Spektrum der Kyma gegenwärtig und erscheint in seiner einheitlic Erscheinungsweise als triadisches Urphanom

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152, 153 Noch einmal variieren wir den Versuch, indem wir die Masse zähflüssiger machen. Wieder entstehen Rund- und Wurmformen mit ihrer Zirkulation und Pulsation; aber nun treten die Strukturen wieder profilierter auf, bei dem Rundgebilde als radialgerichtete Rippen, bei der Langsform als segmentartig verlaufende Gestaltung. Während die Rundform bei gleichbleibender Amplitude an ihrer Stelle verharrt, kriecht das Langsgebilde herum, aber stets in den Ordnungen des Schwingungsverlaufes.

152, 153 We can again vary the experimont by making the mass more viscous. Again round and vermicular forms appear in a state of circulation and pulsation; but now the patterns are more marked with radial ribs in the round configurations and a kind of segmentation in the elongated forms. While the round shape remains stationary if the amplitude is unchanged, the elongated form creeps round but always in conformity with the vibrational pattern.

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BIBLIOGRAPHY

1. Bateson, Gregory, Steps To An Ecology Of Mind, New York: Ballantyne Books, 1972.

2. Blair, Lawrence, Rhythms of Vision, New York: Schocken Books, 1976.

3. Dance, Frank E.X., Human Communication Theory, Harper and Rowe: New York, 1982.

4. Ellul, Jacques, The Technological Society, New York: Vintage Books, 1964.

5. Giedion, Siegfried, Mechanization Takes Command, New York: Oxford University Press, 1948.

6. _____, Space, Time and Architecture, Cambridge, Mass: Harvard University Press, 1967.

7. Heinberg, Richard, Resonance, Toronto: Read/Lee Associates, 1979.

8. Innis, Harold, The Bias of Communication, Toronto: Univ. of Toronto Press, 1951.

9. Jenny, Hans, Cymatics, Basel, Switzerland: Basilius Presse, 1967.

10. Kuhn, Thomas, The Structure of Scientific Revolutions, Chicago: The Univ. of Chicago Press, 1962, 1970 edition.

11. Manners, Peter, "The Future of Cymatic Therapy: Sound and Vibratory Pattern Research", Technology Tomorrow, Vol. 3, No. 3, June 1980.

12. McLuhan, Marshall, Understanding Media, New York: McGraw-Hill, 1964.

13. Mumford, Lewis, The Transformations of Man, New York: Harper and Rowe, 1956.

14. _____, Technics and Civilization, New York: Harcourt, Brace, and World; 1934, 1962 edition.

15. Watzlawick, Paul; Beavin, Janet H.; and Jackson, Don D. Pragmatics of Human Communication, New York: Norton, 1967.

16. Whitehead, Alfred N., Science and the Modern World, New York, MacMillan, 1925.